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The International Development of Space and Its Impact on U.S. National Space Policy

Dale L. Hayden, Colonel, USAF

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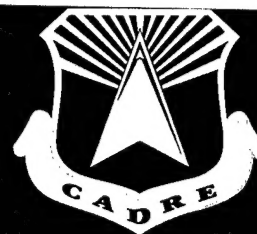
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Preface

This paper uses open source documents to determine the current state of play in space operations within the international community and to propose a viable strategy United States policymakers can use to protect U.S. vital interests. It does not attempt to prescribe specific actions, but rather to suggest in light of other alternatives, one that provides the greatest long term benefit.

I would like to first thank the United States Air Force for providing me the opportunity to conduct my research and develop a thesis in the academic environment of Harvard University. Second, I would like to thank the Weatherhead Center for International Affairs, its director, Professor Jorge Dominguez, and in particular Dr. Kathleen Molony for their unwavering support and encouragement throughout the academic year. Finally, I would like to extend my sincerest appreciation to Mr. Donald Halstead for his willingness to assist a non-academician in defining this paper's scope early in the formative stages, his fortitude through the editing process, and his never wavering enthusiasm and friendship regardless of the issue at hand.

Executive Summary

In September 1962, President John F. Kennedy proclaimed the ultimate goal of American space exploration was to put a man on the moon before the end of that decade. In the forty years since then, America rapidly moved from space exploration to space exploitation, and as the sole remaining superpower, the U.S. now dominates space as it does the arenas of world economics, technology, and military application. Today, space no longer reflects the bipolar nature of the Cold War. Nations freshly emerging from third world status, such as North Korea, now have the ability to join the once elite club of space-faring nations, and U.S. policymakers must take into account the new space race as they develop future U.S. space policy.

The purpose of this paper is to propose a means by which policymakers can best protect U.S. national interests in light of the increased international development of space. It does this by addressing two issues: why following a multilateral, diplomatic and legal approach to confronting international space development is the most beneficial strategy to protecting American national interests; why policymakers will use multilateral engagement to resolve continuous space development issues despite inclinations to act otherwise.

Before proposing a recommend course of action, this paper will first establish a foundation on which an understanding of any thesis must be based, define the significance of space in today's global environment, and detail how space has become an integral part of both national security and economic vitality for developed and developing nations alike. It will then describe U.S. national space policy and how it has evolved over the past forty years, identify the major space-faring nations and outline their capabilities, future objectives and stated national space policies. In delineating the international development of space, the paper draws a close connection between military threat and political-economic competition in space as reasons for concern by American policymakers.

In an attempt to determine the best approach, the paper examines four models that are useful in postulating future actions: technological domination, multilateral action, unilateral action, and an analysis of America as an empire in the twenty-first century. The review of each model identifies historical examples and draws relevant comparisons to space operations. The paper concludes with an analysis of each model and determines why policymakers will select a multilateral approach, as it best protects U.S. national interests.

Table of Contents

	<i>Page</i>
PREFACE	ii
EXECUTIVE SUMMARY	iii
CHAPTER 1: INTRODUCTION	1
CHAPTER 2: WHY IS SPACE IMPORTANT?.....	3
CHAPTER 3: WHAT IS U.S. NATIONAL SPACE POLICY?	7
Organization	7
Space Policy	8
CHAPTER 4: WHO ARE THE PLAYERS?	11
Russia.....	12
China.....	13
Japan	14
European Space Agency (ESA).....	16
The Rest.....	18
CHAPTER 5: WHY BE CONCERNED?	21
Competition	21
Proliferation	22
Surveillance	22
CHAPTER 6: WHAT MODELS CAN BE USED?	25
Technological Domination	25
Multilateral Action	26
Unilateral Action	27
American Empire.....	29
The Best Example.....	30
CHAPTER 7: THE MULTILATERAL APPROACH	31
Why U.S. Policymakers Should Follow a Multilateral Approach	31
Why Policymakers Will Follow a Multilateral Approach.....	33
BIBLIOGRAPHY	37

Chapter 1

Introduction

If you can't take a little bloody nose, maybe you had better go back home and crawl under your bed. It's not safe out here! It's wondrous, with treasures to satiate desires both subtle and gross, but it's not for the timid.

— Q Star Date 42671.3 *STAR TREK: TNG*

Entering the twenty-first century, the United States dominates all other nations in the combined arenas of technology, commerce, and military prowess. Yet in the years following the fall of the Soviet Union, U.S. national leaders have struggled with developing a viable post-Cold War strategy that adequately addresses the desire for continued American hegemony. The terrorist attacks of 11 September 2001 further emphasized the requirement for a new American strategy. The September 2002 National Security Strategy was the first presidential policy document to address both the post-Cold War and post-9/11 environment, and is only the first of many such documents policymakers will draft that reflect a changed international environment.¹ One area directly affected by this changing international scene is the area of space and space operations.

The race for space began in earnest once the Soviet Union launched Sputnik on 4 October 1957. Since the Soviet Union's fall, the race is no longer a bipolar expression of the Cold War, but has developed into a highly complex set of relationships in which multiple nations and organizations across the globe strive to stake out their position in the heavens.

American preeminence in space is consistent with its superpower status; no other nation or organization possesses the full array of intelligence, surveillance, and communications satellites it does. Yet this supremacy also comes at a price, as the United States is more dependent on its space assets than any other nation. The question U.S. policymakers must answer in an era of a dramatically altered landscape is what is the best approach to ensure national space interests are protected. They have numerous models upon which they can base future actions. This paper will review four possible alternatives: technological dominance, multilateralism, unilateralism, and America as an empire.

As during the Cold War, what path policymakers decide to select will reflect how it reacts in other international situations, as space policy is only one reflection of the overall U.S. national security strategy. After considering all alternatives, the approach they select will emphasize multilateralism and international cooperation because the other options are untenable and because the multilateral model provides the greatest long-term prospect for protecting U.S. national interests.

¹U.S. National Security Council, *The National Security Strategy of the United States of America* (National Security Council, September 2002).

Chapter 2

Why Is Space Important?

Why is space important to U.S. national interests? During the Cold War, the space race represented not just national pride, but national security, as well. In the 1960s Vice-President Lyndon B. Johnson stated, "Failure to master space means being second best in every aspect, in the crucial arena of our Cold War world. In the eyes of the world, first in space means first period; second in space is second in everything."¹

Today, space exploration has even wider connotations. The European Union has assessed the importance of space as follows: "a command of space is key to success in the world of modern technology.... The use of space has today penetrated all fields of economic, social and cultural management to a degree that makes space vitally important to the European Union. The ability to continue to develop and use space infrastructures autonomously and competitively, including collecting and using data, is clearly a key priority for Europe."²

During the past forty years, space has moved from exploration to public and private exploitation; in other words, it has become a medium not that different than the land, sea or air. Gordon Adams, Director of Security Policy Studies at George Washington University, puts it this way: "Space is no longer a frontier, used and occupied solely by governments. From an environment in which only governments operated, largely for exploration and military purposes, space has rapidly filled with assets used for intelligence and military operations to civilian communications, to observation and commerce. Today, more launches are dedicated to commercial purposes than to military ones."³ The numbers support his views. In the year 2000, the commercial space industry generated over \$80 billion in worldwide revenue.⁴ The largest share of this commercial market was in satellite services, or the use of satellites to deliver telephone, television, radio, data communications, remote sensing data and government services, accounting for 44.5 percent of total commercial space revenues in 2000.⁵

Using space assets has become an everyday event for the average American, much as television has over the past fifty years. When we turn on the TV, we simply expect the picture and sound to be there; no one speaks with awe about how the video and audio waves appear. Many Americans will start their day by driving to work in an auto with a graphic display that

¹David W. McFaddin, Lt Col, USAF, *Can the U.S. Air Force Weaponize Space?* (research paper, Air War College, Maxwell AFB, AL, 1998), 19.

²EUROPA, *Towards a European Space Policy*, 2002, n.p.; on-line, Internet, 7 March 2002, available from <http://europa.eu.int/comm/space/intro>.

³Gordon Adams, forward, paper by Laurence Nardon, *Satellite Imagery Control: An American Dilemma*, (The French Center on the United States (CFE), Paris, France, March 2002).

⁴John E. Hyten, Col, USAF, "A Sea of Peace or a Theater of War? Dealing with the Inevitable Conflict in Space," *Air and Space Power Journal*, (Fall 2002), 80.

⁵Peter L. Hays, Lt Col, USAF, *United States Military Space: Into the Twenty-First Century*, U.S. Air Force Institute for National Security Studies, U.S. Air Force Academy, INSS Occasional Paper 42, September 2002, 22.

depicts their present location; directs them across town following instructions to a predetermined destination; stop to gas-up by using a credit card at the pump; and remove money from an automated bank teller machine from their account that could be from a different bank in another part of the country. They will think nothing about the technological wizardry, but this set of transactions—location, directions, link to—redit card and banking accounts--are all made possible by instantaneous access to multiple satellite constellations, something we all take for granted. These and other satellite systems can provide navigation for civilian airliners, identify underground water in sub-Saharan Africa, and mark the destruction of the Amazon rain forests, in addition to numerous other everyday services we have all come to expect from a modern society. The failure of a single satellite in May 1998 disabled 80 percent of the pagers in the United States, as well as video feeds for cable and broadcast transmission, credit card authorization networks, and corporate communication systems. If the Global Positioning System (GPS), a multi-satellite constellation originally designed for military navigational assistance were to experience a major failure, it would disrupt fire, ambulance and police operations around the world; cripple the global financial and banking system; and could in the future threaten air traffic control.⁶ Space, therefore whether we realize it or not, plays an increasingly important role in everyday life.

The evolution of space from a frontier to an operating environment with multiple users raised a new set of issues for American policymakers.⁷ Recognizing the importance of space to U.S. national interests, Congress chartered a review of national security space activities. Released in May 2001, "The Report of the Commission to Assess United States National Security, Space Management and Organization," better known as the Space Commission Report, found that:

The security and economic well-being of the United States and its allies and friends depend on the nation's ability to operate successfully in space. To be able to contribute to peace and stability in a distinctly different but still dangerous and complex global environment, the U.S. needs to remain at the forefront in space, technologically and operationally, as we have in the air, on land and at sea. Specifically, the U.S. must have the capability to use space as an integral part of its ability to manage crises, deter conflicts and if deterrence fails, to prevail in conflict.⁸

The military has long understood the significant of space, which is recognized as the ultimate "high ground" for military operations. Space provides the opportunity for surveillance without the issues of over flight, and instantaneous communications capability that enables command and control of forces across the globe. Secretary of the Air Force Dr. James G. Roche stated that, "Space capabilities in today's world are no longer nice-to-have, they've become

⁶John M. Logsdon, "Just Say Wait to Space Power," *ISSUES in Science and Technology*, on-line, Internet, Spring 2001, available from http://www.nap.edu/issues/17.3/p_logsdon.htm

⁷Gordon Adams, forward, paper by Laurence Nardon, *Satellite Imagery Control: An American Dilemma*, (The French Center on the United States (CFE), Paris, France, March 2002).

⁸The Commission to Assess United States National Security Space Management and Organization, "The Report of the Commission to Assess United States National Security, Space Management and Organization," May 2001, 9.

indispensable at the strategic, operational and tactical levels of war.”⁹ Peter B. Teets, Undersecretary of the Air Force and Director of the National Reconnaissance Office and the senior Department of Defense (DoD) space official, emphasized the critical nature space plays today when he remarked, “I think the recent military conflict [Afghanistan] has shown us, without a doubt, how important the use of space is to national security and military operations.”¹⁰ General Ralph E. Eberhart, Commander-in-Chief, United States Space Command, pointed out that, “Most anyone involved in military operations, whether military or civilian, would tell you space is becoming increasingly important. Looking back to how we leveraged our space assets in Desert Storm, compare that to Kosovo—or how we can leverage them even today as we have made advancements since Kosovo—and I think it is obvious how important and how much we rely on capabilities that are resident in our information that moves through space.”¹¹ Or as General Lance W. Lord, Commander, Air Force Space Command, succinctly put it, “If you’re not in space, you’re not in the race.”¹²

⁹Scott Elliott, TSgt, USAF, “SECAF: Space forces have become indispensable,” *Air Force News Link*, on-line, Internet, 24 September 2002, available from <http://www.af.mil/news/Sep2002/92402411.shtml>.

¹⁰Scott Elliott, TSgt, USAF, “Partnership will guide military, civilian space activities,” *Air Force News Link*, on-line Internet, 17 October 2002, available from <http://www.af.mil/news/Oct2002/101702364.shtml>.

¹¹Gerry J. Gilmore, “Space must be top national priority, says SPACECOM chief,” *Air Force News Link*, on-line, Internet, 18 September 2002, http://www.af.mil/news/Apr20010406_0480.shtml.

¹²Lance W. Lord, General, USAF, Command, Air Force Space Command, comments made to Lt Col Dale L. Hayden, Deputy Director of Staff, Air Force Space Command, 1 May 2002.

Chapter 3

What Is U.S. National Space Policy?

Organization

Any understanding of U.S. space policy must begin with an explanation of who is responsible for what. Following the Soviet Union's Sputnik launch in 1957, which made the U.S.S.R the first space-faring nation, the U.S. grappled with the means and policy to respond. The Eisenhower administration moved rapidly to determine a direction for America's space effort and created the National Aeronautics and Space Administration (NASA) on 1 October 1958, which dictated the civilian route of the U.S. entry into space. During this same period, the U.S. Air Force moved quickly to stake its claim to military operational interests. General Thomas D. White issued the first Air Force space doctrine on 29 November 1957, which included the ideas that spacepower would someday prove as dominant in combat as the Air Force believed that airpower already was, and that the Air Force should have operational control over all forces within this medium.¹

Today, civilian-operated NASA controls manned space flight and space exploration, while the DoD directs the nation's military space efforts, with the Army, Navy, and Air Force operating separate organizations within their services responsible for space application. Following the Space Commission Report in May 2001, DoD identified the Air Force as the military's executive agent of space, reporting to the Under Secretary of the Air Force.² Within the Air Force, Air Force Space Command serves as the "space corps" discussed in the commission's report, with cradle-to-grave responsibility for space systems acquisition and operations.³ Further streamlining the administrative function of space within DoD, effective 1 October 2002, United States Strategic Command assumed control of military space as the nation's unified command.⁴

One significant change since the earliest days of the U.S. space program is the current state of cooperation between NASA and the military. Through much of U.S. space history, NASA and the military competed for resources, which is understandable, with space being an extension of Cold War expectations. During the post-Cold War era, however, the paradigm has changed,

¹Mathew J. Mowthorpe, "The United States Approach to Military Space During the Cold War," *Air and Space Power Chronicles*, (8 March 2001), 2.

²William A. Davidson, SAF/AA, Letter, Subject: Organizational Stand-Up of Executive Agent for Space, 12 April 2002, Department of the Air Force.

³The Commission to Assess United States National Security Space Management and Organization, "The Report of the Commission to Assess United States National Security, Space Management and Organization," May 2001, 80.

⁴Jim Garamone, "Strategic, Space Command to Merge," *American Forces Information Service News Article*, n.p.; on-line, Internet, 26 June 2002, available from http://www.defenselink.mil/news/jun2002/n06262002_2--2-6266.html.

culminating in May 2002, when Congress directed the Secretary of the Air Force to continue the growing cooperative relationship with NASA and explore the possibility of a joint development project for future spacelift that could meet each organization's requirements.⁵

Space Policy

Just as the U.S. national security strategy evolved and adapted to a changing international environment, so did space policy. During the Cold War, it reflected the struggle between East and West. According to Matthew J. Mowthorpe, author of *U.S. Military Approach to Space During the Cold War*, during the early period of the Cold War, American administrations generally viewed space from a sanctuary point of view; that is, the realm of space should not be used for military purposes and should remain free from weapons. Space could then provide strategic stability by providing surveillance of missile launches, which increased the survivability of retaliatory strategic forces.⁶

During the 1980s, the Reagan administration shifted U.S. policy from viewing space as a surveillance medium to exploring the feasibility of using space for strategic defense.⁷ Announcement of the Strategic Defense Initiative in March 1983, coupled with the *Challenger* disaster in January 1986, led to a revised U.S. space policy in January 1988 that set out four new pillars for space: deterring or defending against enemy attack; assured U.S. space access; negating hostile space systems; and enhancing operations of U.S. and allied forces.⁸ The Reagan administration's shift in policy implied for the first time space was not a pristine environment, but, like land, sea and air, was another arena for military operations.

As the first post-Cold War statement of national space policy, the 1996 U.S. National Space Policy continued this trend and announced, "Access to and use of space is central for preserving peace and protecting U.S. national security as well as civil and commercial interests."⁹ Completing the transition in national space policy, President Clinton's secretary of defense, William Cohen, wrote in a letter to his service secretaries and senior military personnel, "Space is a medium like the land, sea, and air within which military activities will be conducted to achieve U.S. national security objectives."¹⁰ Recognizing the increasing importance of space, the National Security Strategy (NSS) of December 1999 declared for the first time that the "unimpeded access to and use of space is a vital national interest."¹¹

⁵United States Congress, Senate Armed Services Committee, National Defense Authorization Act for FY 2003 Report, *SpaceRef.com*, n.p.; on-line, Internet, 23 May 2002, available from <http://www.spaceref.com/news/viewstr.html>.

⁶Mathew J. Mowthorpe, "The United States Approach to Military Space During the Cold War," *Air and Space Power Chronicles*, (8 March 2001), 11.

⁷*Ibid.*, 4.

⁸The White House, "Presidential Directive on National Space Policy," 11 February 1988, 1.

⁹Scott Elliott, TSgt, USAF, "SECAF: Space forces have become indispensable," *Air Force News Link*, on-line, Internet, 24 September 2002, available from <http://www.af.mil/news/Sep2002/92402411.shtml>.

¹⁰Scott Elliott, TSgt, USAF, "Partnership will guide military, civilian space activities," *Air Force News Link*, on-line Internet, 17 October 2002, available from <http://www.af.mil/news/Oct2002/101702364.shtml>.

¹¹Gerry J. Gilmore, "Space must be top national priority, says SPACECOM chief," *Air Force News Link*, on-line, Internet, 18 September 2002, http://www.af.mil/news/Apr20010406_0480.shtml.

The congressionally chartered "Space Commission" completed the current evolution of U.S. space policy when it reached five unanimous conclusions in its report:

1. The present extent of U.S. dependence on space, the rapid pace at which this dependence is increasing, and the vulnerability it creates all demand that U.S. national security space interests be recognized as a top national security priority.
2. The U.S. government—in particular, the Department of Defense and the Intelligence Community—is not yet arranged or focused to meet the national security space needs of the twenty-first century.
3. U.S. national security space programs are vital to peace and stability.
4. We know from history that every medium—air, land, and sea—has seen conflict; reality indicates that space will be no different. Given this virtual certainty, the U.S. must develop the means both to deter and to defend against hostile acts in and from space.
5. Investment in science and technology resources—not just facilities, but people—is essential if the U.S. is to remain the world's leading space-faring nation.¹²

The Bush administration's National Security Strategy of September 2002 remained consistent with the policy transition began during the Reagan administration. The new NSS addressed space in the post-9/11 environment:

Before the war in Afghanistan, that area [space] was low on the list of major planning contingencies. Yet, in a very short time, we had to operate across the length and breadth of that remote nation, using every branch of the armed forces. We must prepare for more such deployments by developing assets such as advanced remote sensing, long-range precision strike capabilities, and transformed maneuver and expeditionary forces. This broad portfolio of military capabilities must also include the ability to defend the homeland, conduct information operations, ensure U.S. access to distant theaters, and protect critical U.S. infrastructure and assets in outer space.¹³

¹²The Commission to Assess United States National Security Space Management and Organization, "The Report of the Commission to Assess United States National Security, Space Management and Organization," May 2001, 99-100.

¹³U.S. National Security Council, *The National Security Strategy of the United States of America* (National Security Council, September 2002), 29-30.

Seeing a need to update the 1996 U.S. space policy to reflect both the post-Cold War and post-9/11 situations, on 28 June 2002 President Bush instructed the National Security Council to chair a review of U.S. space policies and report back during 2003. He directed the review to focus on: United States policy on commercial remote sensing and on foreign access to remote sensing space capabilities; U.S. space transportation policy; and a revision, consolidation, and/or elimination of existing national policy statements related to space activities.¹⁴

The question yet unanswered is how bold will the new policy be? Will it depict a new era of exploration with a manned mission to Mars; will it recognize the increased international involvement in space; will it emphasize engagement and cooperation; or will it restrict U.S. involvement; shrink the U.S. space program; return to the unilateralism of the Cold War? Policymakers will have to take into account many diverse factors as they determine the path for the twenty-first century. Understanding who the international players are in space and what they bring to the table will help determine the direction.

¹⁴The White House, Presidential Directive re. National Space Policy Review, NSPD-15, June 28, 2002.

Chapter 4

Who are the Players?

Throughout most of the Cold War, the United States and the Soviet Union were the only nations with the industrial infrastructure and political will to break the bounds of earth. Today, in addition to the European Space Agency consortium, no less than seven countries have space launch capability.¹ Furthermore, space activities are moving away from government operation and are becoming increasingly commercially orientated. According to Charles V. Peña of the Cato Institute, space, as it relates to national security, may be shaped and influenced more by the future of commercial space activities rather than international military competition.²

During the 1990s, the U.S., Europe, China and Russia developed proven commercial launch capabilities. Orbital Sciences Corporation of Dulles, Virginia launched a Department of Defense satellite aboard an air-launched Pegasus rocket in 1990, becoming the first privately developed space launch vehicle to be sold to the government on a commercial basis.³ The European Space Agency's family of Ariane vehicles has been the chief U.S. competitor in the international launch market, and has dominated the market by launching 55 percent of all commercial payloads between 1990 and 1995; China's Long-March vehicle captured 9 percent of commercial payloads in the first half of the decade, compared to the U.S. 36 percent share.⁴ Russia entered the commercial launch market through a consortium with Lockheed Martin called International Launch Services, while offering other independent commercial launch services at the same time. India, Israel, Japan, and Australia round out the list of countries with proven space launch capabilities, and with the exception of Japan, have yet to offer international commercial services.

It may well be that future space exploitation may not be restricted to governments and multinational corporations, but may follow the proliferation pattern exhibited by aviation. One such example is an attempt to emulate the aviation industry of the early 1920s when private organizations offered monetary rewards in attempts to spur technological development. In the spirit of Charles Lindbergh and his winning the race for the first solo flight across the Atlantic, a group of St. Louis, Missouri-based business leaders started the X-Prize in 1996 to promote private space travel. In all, 21 teams from 6 countries, Argentina, Canada, Romania, Russia, Britain and the U.S., have so far joined the competition for \$10 million prize to the first amateur

¹Nations with space-faring capability: United States, Russia, China, Japan, India, Australia, and Israel.

²Charles V. Peña, "U.S. Commercial Space Programs: Future Priorities and Implications for National Security," *Future Security in Space: Commercial, Military, and Arms Control Trade-Offs*, James Clay Moltz, ed., Center for Nonproliferation Studies, Mountbatten Centre for International Studies, University of Southampton, (July 2002), 10.

³Christopher Myers and Jonathan Ball, "Space Transportation," *Space Web*, n.p.; on-line, Internet, available from http://home.att.net/~SpaceWeb/SPSM5900/Nat_Pol.htm, 2.

⁴Ibid.

team that builds and flies a manned craft into space.⁵ Amateur un-manned programs have proliferated as capabilities increase and cost decreases. The California-based Reaction Research Society sent a rocket payload up 53 miles in 1996, while the Civilian Space eXploration Team (CSXT), a Minnesota-based group, has twice attempted to reach the edge of space, most recently in September 2002.⁶

Nevertheless, despite great commercial and private involvement, for the immediate future space principally remains the purview of nation-states. Space exploration reflects national pride, as well as representing strategic national interests. Henry Kissinger, noted the “international system of the twenty-first century will contain at least six major powers—the United States, Europe, China, Japan, Russia, and probably India....”⁷ This also happens to be the powers most capable of independently projecting national aspirations into space, in both the present and near term. Each has highly capable industrial infrastructures and possesses the will to expend scarce resources to support their space-faring goals.

None of these powers yet has the ability to threaten U.S. dominance in space directly; however, to obtain an accurate picture one must look not only at capabilities, but at future intent as well. But, before determining what impact each might have on future U.S. policy, it is first necessary to review the current state of play in each nation. A logical place to begin is with Russia, the inheritor of much of the Soviet Union’s Cold War space heritage.

Russia

The Russian government inherited both vast capabilities and significant challenges from its Soviet predecessor. The Russian Space Agency and the Russian Militant Space Forces, both founded in 1992, were given the responsibility for maintaining a diverse constellation of approximately 170 operational spacecraft and the industry behind them.⁸ Today, the Russian space program faces many daunting challenges with shortfalls in financing being blamed for a series of rocket explosions in the 1990s.⁹ Yuri Koptev, Russian Aerospace Agency director, concluded that the steady decline of Moscow’s space program meant it was only capable of providing services to others and could no longer independently launch any major missions. The Russian space budget has shrunk to one-nineteenth of what it was in 1989. Mr. Koptev remarked at a conference on space research in December 2002, “Our NASA colleagues are terrified by the

⁵Richard Stenger, “Armadillo, Romanians join \$10 million space race,” CNN.com, n.p.; on-line, Internet, 17 October 2002, 1827 GMT, available from <http://www.cnn.com/2002/TECH/space/10/17/xprize.contest/index.html>.

⁶Richard Stenger, “Science & Space, Amateur rocket fizzles in record attempt,” CNN.com, n.p.; on-line, Internet, 27 September 2002, 1402 GMT, available from <http://www.cnn.com/2002/TECH/space/09/27/rocket.failure/index.html>.

⁷Samuel P. Huntington, *The Clash of Civilizations and the Remaking of World Order*, (New York: Simon & Schuster, 1996) 28.

⁸FAS Space Policy Project, “Russian and Soviet Space Agencies,” *World Space Guide*, n.p.; on-line, Internet, available from <http://www.fas.org/spp/guide/russia/agency/index.html>.

⁹Cable News Network, “Russian Soyuz blow up, killing one,” CNN.com, n.p.; on-line, Internet, 16 October 2002, available from <http://www.cnn.com/2002/TECH/space/10/16/soyuz.explosion.reut/index.html>.

fact that their budget amounts to \$15 billion a year, but Russia's space budget totals \$309 million." He added that India spends nearly \$530 million annually on space research.¹⁰

Underfunding not only affects the Russian space effort, but its infrastructure as well. A May 2001 fire at Serpukhov, 150 miles from Moscow, severely damaged Russian command and control capabilities, while in May 2002, a roof collapsed at the Baikonur cosmodrome, killing six workers and damaging the Buran shuttle spacecraft, the only one of three built to have flown in space. The Soviets initiated the Buran project in 1976 in response to the U.S. shuttle program, but abandoned it after the fall of the Soviet Union.¹¹

Further hampering the Russian space effort is the location of its main launch site at the Baikonur cosmodrome in the now independent Republic of Kazakhstan, in the former Soviet Central Asia. Moscow leases the facility from its neighbor, but has been trying to shift launches to its own Plesetsk cosmodrome, which represents yet another funding challenge.¹²

Russia retains a robust launch capability able to place objects in both near-earth and deep-space orbits. Its Soyuz rocket, the backbone of Russia's space operations, traces its origins to the rocket that sent the first man, Yuri Gagarin of the Soviet Union, into space in 1961. It remains highly reliable, and has experienced only one failure within the last eleven years. Following the space shuttle *Columbia* accident of February 2003, Russia's launch capability represents the only viable lifeline to the International Space Station (ISS), of which Russia is a full partner. While the past presents a proud heritage for the Russian space program, and the present displays hope, the future may not be as bright.

China

Another Cold War adversary and potential competitor is the Peoples' Republic of China, which has made significant advances in reaching its goals as a space-faring nation. It launched its first satellite on 24 April 1970 and possesses a robust family of boosters called Long-March. Launching from three sites—Jiuquan, Xichang and Taiyuan—it has established an integrated command and control network capable of directing satellites in both near-earth and geostationary orbit, the largest models being three tons.¹³ On 20 November 1999, China launched and then recovered the next day an unmanned experimental spacecraft, taking its first steps toward reaching manned space flight.¹⁴ The *China Business Times*, a Chinese government-run publication, noted the military implications for the space flight, as well. It quoted a Chinese

¹⁰"Top official deplores decline of Russian space program," *Sydney Morning Herald*, SMH.com.au, n.p.; on-line, Internet, 12 December 2002, available from <http://www.smh.com.au/articles/2002/12/11/1039379887168.html>.

¹¹British Broadcasting Channel, "Bodies found in cosmodrome debris", BBC News, n.p.; on-line, Internet, 13 May 2002, 1136 GMT, available from <http://news.bbc.co.uk/2/hi/europe/1983638.stm>.

¹²Cable News Network, "Russian Soyuz blow up, killing one," CNN.com, n.p.; on-line, Internet, 16 October 2002, 1352 GMT, available from <http://www.cnn.com/2002/Tech/space/10/16/soyuz.explosion.reut/index.html>.

¹³People's Republic of China, The Information Office of the State Council, "China's Space Activities," n.p.; on-line, Internet, November 22, 2000, available from <http://www.fas.org/spp/guide/china/wp112200.html>.

¹⁴People's Republic of China, The Information Office of the State Council, "The day of carrier space flight of China is not far off," n.p.; on-line, Internet, 21 November 1999, available from <http://www.cnsa.gov.cn/news/20021112002e.htm>.

military expert as stating the same low-power propulsion technology used to adjust a spacecraft's orbit could also be used to alter the path of offensive missiles, helping them evade proposed U.S. anti-missile defense systems.¹⁵

Luan Enjie, administrator of the Chinese National Space Agency, proclaimed at the Third United Nations conference on the Exploration and Peaceful Uses of Outer Space on 4 October 2000, "The development and application level of the space technology has become an important indicator of a nation's comprehensive strength. Sustained development and application of the space technology has been the important topic of every country dedicated to its own development." He went on to state that "China will actively and pragmatically implement a comprehensive multi-layer and multi-form strategy of international cooperation and exchange in space technology according to the market demands of space science, space technology and space application. The new century is a century for Chinese space industry to develop continuously."¹⁶ China's tenth Five Year Plan, published in December 2001, gave more details of its space goals and articulated a new generation of boosters with greater thrust, higher reliability and lower cost. It also described aspirations for a manned space program that could potentially lead to lunar and deep space exploration.¹⁷

China faces many challenges in the near future as it strives to fulfill its promise. To date, it appears to be effectively transforming itself from a command economy to more of a capitalist model. A new moneyed elite is emerging, and entrepreneurs were welcomed for the first time at a Chinese Communist Party Congress in November 2002, yet vast areas within China remain unaffected by the economic boom of the past decade. Furthermore, officials are struggling with the question of how to reform the Party while retaining control of the government, something few one-party systems have ever done effectively. While there is no guarantee China will reach its potential, underestimating it would be foolhardy. China sees itself as a future world player and must be taken seriously.

Japan

Long in the shadow of shared U.S. space technology, Japan is beginning to strike an independent path. The National Space Development Agency (NASDA), established in 1969 to oversee most of Japan's space effort, witnessed its first satellite launch in 1970. Over the next two decades, Japan based its booster program on shared U.S. technology, but during the 1980s, it began developing a domestically designed booster to take advantage of the growing commercial market and to increase its flexibility.¹⁸ Though it was poised to enter the competitive commercial

¹⁵Robert Windrem and Alan Boyle, "China space shot has military implications," MSNBC, n.p.; on-line, Internet, 23 November 1999, available from <http://www.msnbc.com/news/211770.asp?cp1=1>.

¹⁶Luan Enjie, "Chinese Space Undertakings toward the 21st Century," *World Space Week News*, n.p.; on-line, Internet, 4 October 2000, available from, http://www.cnsa.gov.cn/wsw/read-news_e.asp?mc=News&tmjz=24&xsyh=01.

¹⁷People's Republic of China, The Information Office of the State Council, "Development of China's Aerospace Industry during the 10th Five Year Plan," n.p.; on-line, Internet, 12 March 2001, available from <http://www.fas.org/spp/guide/china/bjb031201.html>.

¹⁸National Aeronautics Space Development Association, "To A New Phase of Japanese Rocket Development," NASDA Report, No. 51, n.p.; on-line, Internet, September 1996, available from http://www.nasda.go.jp/lib/nasda-news/1996/09/series_e.html.

market with its domestically produced H-2 booster, Japan experienced failure after failure, and eventually canceled the H-2 program in 1999.¹⁹ In August 2001, Japan successfully launched its H-2A booster, which ended six major setbacks in seven years, restoring much of Japanese's sapped morale.²⁰

Today, the Japanese vision for space development is based on the following NASDA doctrine:

1. Establishing a strong foundation for the future of Japanese space development programs
2. Involvement in developing new and innovative space technologies and systems
3. Promoting international cooperation programs by sharing philosophical ideas behind the future of space development.²¹

As a result of this direction, Japan has placed higher priority on four areas: construction of a global earth observation system; promoting advanced space science and unmanned lunar exploration; an in-orbit laboratory; and developing and operating new space program infrastructures.²² Looking toward space exploration and a potential lunar exploration, Japan is poised to begin testing an unmanned landing and take-off system in hopes that one day it will lead to a reusable shuttle or other spacecraft.²³

Nevertheless, despite lofty goals and aspirations, the Japanese space program faces significant challenges. The NASDA budget currently represents about 0.035% of Japan's gross national product, about half of the European Space Agency budget and one-tenth of the NASA budget.²⁴ Conservative estimates place the fifteen-year cost for NASDA's proposals at \$70 billion, a figure far exceeding the current budget proposals.²⁵ Further complicating finances, Hughes satellite manufacturing pulled out of a contract with Japan to launch ten of its satellites on the H-2A, and other clients seem reluctant to risk their satellites on this still unproven rocket,

¹⁹British Broadcasting Channel, "Japanese rocket blasts off," BBC NEWS, n.p.; on-line, Internet, 29 August 2001, 1044 GMT, available from <http://news.bbc.co.uk/2/hi/science/nature/1514468.stm>.

²⁰David Whitehouse, "Japan's uncertain space future," BBC NEWS, n.p.; on-line, Internet, 29 August 2001, 1241 GMT, available from <http://news.bbc.co.uk/2/hi/science/nature/1515095.stm>.

²¹"Japan Sets Space Program Thrust," *AOARD Asia Science Letter*, Vol 5, January 1995, n.p.; on-line, Internet, available from <http://www.nmjc.org/aoard/ASL.5.www.html>

²²Ibid.

²³Cable News Network, "Japan to test shuttle technology," CNN.com, n.p.; on-line, Internet, 7 September 2002, available from <http://www.cnn.com/2002/TECH/space/09/07/japan.shuttle.ap/index.html>

²⁴"NASDA's Successes: Role and achievements," NASDA Report, n.p.; on-line, Internet, 25 November 1998, available from http://www.nasda.go.jp/press/1998/11/hyouka_981125_a_05_e.html.

²⁵"Japan Sets Space Program Thrust," *AOARD Asia Science Letter*, Vol 5, January 1995, n.p.; on-line, Internet, available from <http://www.nmjc.org/aoard/ASL.5.www.html>

when other, more established launch vehicles are available.²⁶ In addition, the commercial launch business is becoming more competitive, with the introduction in 2002 of Boeing's Delta IV and Lockheed Martin's Atlas V new generation of boosters.

An editorial in the *Yomiuri Shinbun* newspaper expressed public concerns about the Japanese space program, in the light of Japanese involvement in the International Space Station, and the economic stagnation of the Japanese economy over the past decade. Labeling the national goal for space as "unclear mission creep," the editorial concluded with the questions: "How much money is needed for space development? What can be done when? Or, what cannot be done? Is the final goal a practical space manned flight? Or is it just a fundamental technological experiment?"²⁷ These are questions both the Japanese government and its people must answer.

European Space Agency (ESA)

The most immediate commercial competitor to the United States space effort is the European Space Agency. ESA is a consortium of European nations founded in 1973 and today represents fifteen member states.²⁸ ESA's charter is to "provide for and to promote for exclusively peaceful purposes, cooperation among European States in space research and technology and their space applications, with a view to their being used for scientific purposes and operational space applications systems."²⁹ While individual members retain some autonomy and nations such as the United Kingdom (UK) and Germany have expressed space goals, the true might of the European space effort is expressed through the ESA.

Though not a subsidiary of the European Union (EU), the EU and ESA do cooperate closely. Late in 2000, the EU Research Council and the ESA Ministerial Council met and outlined a new European space strategy. Edelgard Bulmahan, Germany's federal minister of education and research, described the strategy as, "aimed at providing Europe with its own access to space."³⁰ The strategy detailed three lines of action: strengthen the foundations of space activities; enhance scientific knowledge; and reap the benefits for society and seize markets opportunities.³¹

²⁶David Whitehouse, "Japan's uncertain space future," BBC NEWS, n.p.; on-line, Internet, 29 August 2001, 1241 GMT, available from <http://news.bbc.co.uk/2/hi/science/nature/1515095.stm>

²⁷Keiko Chino, "Need for Japanese manned spacecraft suddenly argued," *The Yomiuri Shinbun*, n.p.; on-line, Internet, The Planetary Society of Japan: Column, 23 January 2002, available from <http://www.planetary.or.jp/en/colum/20020123.html>

²⁸European Space Agency, "About UNEP's Partner," n.p.; on-line, Internet, 2 December 1997, available from <http://www.unep.org/unep/partners/regional/esa/>

²⁹Ibid.

³⁰Erkki Likanen, "Aerospace and the Evolution of Europe," European Union Press Release, on-line, Internet, 4 October 2002, available from http://europa.eu.int/rapid/start/cgi/guesten.ksh?p_action.gettxt=gt&doc=SPEECH/02/456

³¹European Space Agency, "ESA and the European Union adopt a common strategy for space," European Space Agency Press Release, n.p.; on-line, Internet, 16 November 2000, available from http://www.esa.int/export/csaCP/Pr_74_2000_p_EN.html

According to the ESA, the first line of action encompasses broadening space technology and guaranteeing access to space through a family of launch vehicles. The second sees Europe continuing to pursue cutting-edge technology, while the third has the objectives of seizing market opportunities and meeting new societal demands.³² Whereas lines one and two have significant international implications, with the Ariane family of rockets proving quite reliable and competitive on the commercial market, it is the line three where Europeans see their greatest promise. The European Space Agency puts the case directly: "The challenge is to ensure that Europe can take a fair share of the global market and related jobs."³³ The European Space Agency is a consortium of 15 European nations joined to further European space exploration and exploitations. The 10 founding members of ESA included the largest Western European countries: France, Germany, Italy, Spain and UK, together with Belgium, Denmark, Netherlands, Sweden and Switzerland. Five others joined later: Ireland, Austria, Norway, Finland and Portugal. Canada is a Cooperating State. Most Member States also belong to the European Union, but some do not. Conversely, some members of the EU do not yet belong to ESA. The two bodies are independent of each other, but they interact in evolving European space programs and policy.

In a highly competitive market and with an eye toward peaceful space exploitation, where might Europe be headed? In a 1999 article in *The Parliamentary Monitor Magazine*, Ian Taylor, a United Kingdom Member of Parliament, observed that economic challenges are "transforming the space industry, with larger, leaner suppliers emerging in both the United States and Europe." In an attempt to define what role Europe might play in space, he went on to say, "perhaps we [Europeans] could challenge the U.S. dominance by backing dedicated niche applications," such as better, smaller and cheaper satellites.³⁴

Taking further action toward independence from U.S. and NATO, the European Union, at a 1999 council meeting in Cologne, set a goal of creating a 60,000 person "Rapid Reaction Force" by 2003, able to operate independently with "the necessary means and capabilities to assume its responsibilities regarding a common European policy on security and defense."³⁵ The November 2000 report to the ESA Director General (commonly referred to as the "Wise Men Report") asserted, "without a clear space component, the evolution towards the [European Security and Defense Policy] will be incomplete."³⁶ Clearly, Europe sees space as an arena where it must be actively engaged.

³²Ibid.

³³European Space Agency, "Shaping the future of Europe in Space: which programmes, which needs?," European Space Agency Press Release, n.p.; on-line, Internet, 21 April 1999, available from http://www.esa.int/export/csaCP/Pr_6_1999_i_EN.html

³⁴Ian Taylor, "A Competitive Space," *The Parliamentary Monitor Magazine*, n.p.; on-line, Internet, August 1999, available from <http://www.political.co.uk/iantaylor/articles%200899.htm>

³⁵John M. Logsdon, "A Security Space Capability for Europe? Implications for U.S. Policy," *Security Space Forum*, Space Policy Institute, Elliott School of International Affairs, George Washington University, (Summer 2002), 1.

³⁶Carl Bildt, Jean Peyrelevade, and Lothar Spath, "Towards a Space Agency for the European Union (aka Wise Men Report)," *Report to the ESA Director General*, November 2000, 9.

Europe is also moving ahead with Galileo, a civilian satellite navigation program. Ian Taylor expressed European public opinion when he wrote, "The alternative [to Galileo] is to remain dependent on the military satellite navigation systems of the U.S. (Global Positioning System or GPS) and Russia (Global Navigation Satellite System or GLONASS)."³⁷ Erkki Liikanen, a member of the European Commission responsible for Enterprise and the Information Society, reiterated Taylor's earlier remarks at an October 2002 conference in The Hague, saying:

On space, the main commission actions are concentrated on the development of the Galileo positioning and navigation system and the global monitoring for environment and security (GMES) initiative... I believe it is essential to develop future space programs under the political umbrella of the European Union, given the strategic importance of space capabilities and increased reliance on space-based applications to implement individual European policies.³⁸

The European Union and ESA have both the political drive and the technological ability to implement their goals; the problematic area is funding. A conservative estimate to meet Europe's space security goals over the next fifteen years is in excess of 8.5 billion euros.³⁹ The question remains, will an expanding EU, taking ten new members during 2002 with a combined population of over 550 million people, be able to reach its lofty goals for space, or will it be forced to concentrate on more immediate social problems? Regardless of the answer, the U.S. can no longer ignore the growing European space capabilities.

The Rest

The remaining space-faring nations include India, Australia, Israel, and potentially North Korea. Each has demonstrated space access capabilities to varying degrees of success. Looking at their accomplishments and aspirations shows that the future model for international development in space will be proliferation rather than retrenchment.

India became a space-faring nation on 15 October 1994 with the successful launch of its PSLV-D2 rocket with a 804kg Indian Remote Sensing (IRS)-P2 satellite. The focus of India's space program is in the arena of weather, surveillance, and communications, particularly in light of increased tensions with its Pakistani neighbors. The Indian launch program remains active, with the seventh successful flight of its indigenous Polar Satellite Launch Vehicle in September 2002, which placed its first dedicated weather satellite in orbit.⁴⁰

³⁷Ian Taylor, "A Competitive Space," *The Parliamentary Monitor Magazine*, n.p.; on-line, Internet, August 1999, available from <http://www.political.co.uk/iantaylor/articles%200899.htm>.

³⁸Erkki Liikanen, "Aerospace and the Evolution of Europe," European Union Press Release, on-line, Internet, 4 October 2002, available from http://europa.eu.int/rapid/start/cgi/guesten.ksh?p_action.gettxt=gt&doc=SPEECH/02/456.

³⁹Daneil Gavoty, "L'espace Militaire, un Projet Federateur pour l'Union Europeenne," *Defense Nationale*, (October 2001), 95.

⁴⁰"India launches its first weather satellite," CNN.com, n.p.; on-line, Internet, 12 September 2002, available from <http://www.cnn.com/2002/TECH/space/09/12/india.satellite.reut/index.html>

Australia has a distinguished history of space flight, mostly through their cooperation in U.S. and British launches from their Woomera launch site. Australia has on numerous occasions attempted to join the space-faring nations independent of its old allies. The latest attempt occurred in 1999, when Spacelift Australia Ltd signed an agreement with Russia to launch payloads under 800 kilograms into low earth orbit. The agreement remains only a stated goal at this time, as the company has yet to meet its planned test launch of 2001.⁴¹ Australia continues to await independent launch capability without a clear path to obtain it.

The *Israeli* space program also has a long history, dating back to 1961 with the launch of its first solid fueled mini-rocket. Desiring greater independence and self-reliance following the 1986 *Challenger* accident, Israel felt compelled to develop an indigenous space capability, and on 19 September 1988 launched its first domestically constructed satellite.⁴² Since 1988, Israel has continued domestic satellite launches from its Palmanchim site, though it also relies upon U.S. and ESA launch support for surveillance and communications capabilities.

Finally, *North Korea* announced on 4 September 1998 that it had placed its first satellite into orbit aboard a Taep'o-dong rocket.⁴³ While international debate immediately erupted concerning the success and intent of the launch, North Korea certainly exhibited both ICBM and space launch intent, if not full capability. Coupled with the open admission of a continuing nuclear research program, North Korea presents a clear challenge to U.S. policymakers in the areas of both international relations and space development.

This brief review of space-faring nations points to a future where space capability represents not just a nation's pride, but also its strategic interests. U.S. policymakers face many uncertainties, though possibly none is more daunting than intent and direction of international space development. Due to the increased activity over the past decade, the question remains whether the U.S. should be concerned and if so, what is the best approach to protect its own national interests.

⁴¹"Spacelift: Spacelift Australia- SS-25 missile," *SpaceDaily*, on-line, Internet, August 1999, available from <http://www.spacedaily.com/news/aust-99e.html>.

⁴²Israeli Space Agency, "Israel Space Agency History: ISA foundation and The Israeli space age," n.p.; on-line, Internet, available from <http://www.geocities.com/CapeCanaveral/5150/isahist.htm>.

⁴³Monterey Institute of International Studies, "North Korea's Ballistic Missile Program," *CNS-The 31 August 1998 North Korean Satellite Launch: Factsheet*, n.p.; on-line, Internet, available from <http://cns.miiis.edu/research/korea/factsht.ht>.

Chapter 5

Why Be Concerned?

Every nation with space-faring capability or aspirations openly touts their peaceful intentions for space. There is open cooperation between the U.S., Canada, Japan, Russia the EU and ESA, and on the International Space Station. Furthermore, international agreements and treaties discourage weapons in space. But to appreciate the impact of increased international development in space, it is necessary to widen the concept of threat. Threat need not be simply defined as militarily based; policymakers must expand the concept to include economic development, because underlying the openly peaceful aspirations for space that are universally expressed are the realistic expressions concerning national security and self-interests. Three areas that provide some indication of the threat are competition, proliferation, and surveillance.

Competition

In the previous chapter, this paper summarized the aspect of the competition within the launch sector. The European Space Agency's Ariane, China's Long-March, Russia's Soyuz, and the Japanese H-2A boosters have all proven highly reliable, and American industry is positioning itself for the future with successful launches of the Delta IV and Atlas V boosters. However, launch competition is only one challenge facing the United States. A greater concern to policymakers might well be competition in areas they consider safe, specifically the high technology sector.

The ESA has openly expressed the goal of improving its market share in a number of areas, including the civilian navigational satellite market through the program entitled Galileo. Referring to Galileo in a January 2002 statement, Claudio Mastracci, ESA's director of application programs, said, "The stakes here [with Galileo] are commercial. The technical issues can be worked out between us [U.S. and Europe] without much difficulty. They are not a problem."¹ French President Jacques Chirac's comments on the situation can be interpreted from an economic as well as a political perspective when he suggested the failure to go ahead with Galileo would have resulted in Europe becoming a "vassal" of the United States.²

¹Peter B. de Selding, "Europeans Blame U.S. Government for Galileo Delay," *SPACENEWS International*, Volume 13 Number 3, (21 January 2002), 6.

²John M. Logsdon, "A Security Space Capability for Europe? Implications for U.S. Policy," Remarks at a symposium on the occasion of the 40th anniversary of the French Space Agency CNES, December 18, 2001, Space Policy Institute, Elliott School of International Affairs, George Washington University.

In light of potential commercial competition, policymakers must address the state of health of the American space industry. Satellite manufacturing is now the second largest component of the commercial space sector, growing 47.5 percent between 1996 and 2000, where it accounted for \$18.3 billion, or 22 percent of the total commercial space revenue in 2000.³ But, is it healthy enough to sustain competition from European consortiums that have proven quite capable and competitive? In light of the success in the European aerospace industry, the answer is not simple.

Proliferation

Beyond the challenge exhibited by direct competition, the U.S. must face the specter of technological proliferation. Commercial space launch enterprises have produced some unexpected consequences for U.S. national space policy. Following a Chinese Long-March-2E vehicle failure in January 1995 with a Hughes Space and Communications satellite payload onboard, China and Hughes immediately commissioned an independent review to determine the cause of the failure. The U.S. State Department concluded in its analysis of the review that, "Hughes assistance directly supported the Chinese space program in the areas of anomaly analysis/accident investigation, telemetry analysis, coupled loads analysis, hardware design and manufacturing, testing, and weather analysis. Moreover, the assistance provided by Hughes is likely to improve the standing of the Chinese in the commercial launch market, as they make improvements in spacelift reliability and performance."⁴ The report went on to state, "The long-term effect of increased reliability will be to improve the rate of successful deployment of Chinese satellites and, in turn, to facilitate China's access to space for commercial and military programs."⁵ China has not had a failure of its Long-March family of vehicles since the assistance from Hughes.

History has proven technology is extremely difficult to contain, with proliferation appearing as the natural order of things. Accordingly, America is faced with enhanced Chinese spacelift capabilities, increased commercial launch competition, and the potential transfer of technology from the civilian to the military sector. Policymakers must decide what the appropriate response to proliferation is in an era of the Internet, professional journals, and ready access by the international community to American colleges and universities.

Surveillance

Beyond the arena of increased surveillance capability posed by nation-states, U.S. policymakers must also concern themselves with commercially available imagery. Over the past decade, numerous companies have begun providing high-resolution satellite imagery to those willing to purchase their product. One example is the SPOT Image Corporation of France that

³Peter L. Hays, Lt Col, USAF, *United States Military Space: Into the Twenty-First Century*, U.S. Air Force Institute for National Security Studies, U.S. Air Force Academy, INSS Occasional Paper 42, September 2002, 21.

⁴United States State Department, "Satellite Launches in the PRC: Hughes," *State Department Assessment of Damage to National Security*, Washington, D.C., 18 December 1998, 8.

⁵*Ibid.*, 9.

has been commercially offering high-resolution imagery since the early 1990s. SPOT provides earth observation products for such diverse applications as agriculture, cartography, cadastral mapping, environmental studies, urban planning, telecommunications, surveillance, forestry, land use/land-cover mapping, natural hazard assessments, flood risk management, oil and gas exploration, geology and civil engineering.⁶

The concern over commercially available imagery became so great during the 2002 Afghanistan campaign that the U.S. National Imagery and Mapping Agency (NIMA) purchased exclusive rights to pictures taken of the war zone by Space Imaging's Ikonos satellite, which has 1-meter black and white resolution and 4-meter color resolution. According to Charles Peña of the Cato Institute, this "buy to deny" policy is an example that demonstrates the importance of and demand for commercial space assets.⁷ While such arrangements augment government-owned resources, they also preclude others from obtain like intelligence data.

Commercial imagery is rapidly improving, with less than one-meter resolution available in the near future, and as it becomes more profitable, new companies will certainly be enticed to enter the marketplace. What will the impact of greater availability and improved fidelity be on U.S. national security, and how will policymakers respond to this challenge? The next chapter provides examples of potential American responses.

⁶SPOT Image Corporation, n.p.; on-line, Internet, available from <http://www.spot.com/>.

⁷Charles V. Peña, "U.S. Commercial Space Programs: Future Priorities and Implications for National Security," *Future Security in Space: Commercial, Military, and Arms Control Trade-Offs*, James Clay Moltz, ed., Center for Nonproliferation Studies, Mountbatten Centre for International Studies, University of Southampton, (July 2002), 10.

Chapter 6

What Models Can Be Used?

In an attempt to better understand what policy implications the international development of space might have on U.S. national space policy, it could be helpful to analyze some historical examples or models. History cannot predict the future, but it can assist in gaining an appreciation for actions governments might take when faced with external stress factors. This paper will accordingly look at four potential models: technological domination, multilateral action, unilateral action, and the American Empire.

Technological Domination

Space is often compared to the high seas, as they share numerous commonalities, such as exploration and international law. It even captures the human imagination today much as the high seas excited generations of explorers like Leif Erickson, Ferdinand Magellan, and James Cook. If the comparison between space and the high seas holds, lessons can be learned from analyzing how a naval superpower, Britain, maintained her status during the latter half of the nineteenth century, a period of great technological change.

For the better part of two centuries, the British Royal Navy ruled the high seas virtually unchallenged, dominating the next two largest navies, the French and Spanish, in engagement after engagement. The Royal Navy projected British power to contain threats in Europe and abroad, ensured the flow of commerce from India, Asia, Africa and the Americas, and extended British colonial expansion and control. With such a high dependence on naval power, how did the British protect their lead?

Following the advantages gained by the British during the eighteenth century, they rapidly moved to ensure their continued dominance. Lacking a true rival in the last half of the nineteenth century, the British took full advantage of their superiority in shipbuilding and design. In less than twenty years they moved from the wooden man-of-war that had dominated the high seas for centuries, to ironclads and battleships that held naval dominance well into the twentieth century. Lack of an immediate threat and direct competition allowed the British to use their industrial base to ensure a technological lead. They were able to build "sample fleets," test them in real environments, choose what worked best, and discard the rest.¹ The British technological advantage in industrial capacity and design also brought about the age of great luxury liners with ships like the Queen Mary.

How does this model of technological domination relate to U.S. space systems? In his book ... *the Heavens and the Earth*, Walter McDougall relates the story of the early days of the

¹John F. Beeler, *British Naval Policy in the Gladstone-Disraeli Era 1866-1880*, (Stanford, California, Stanford University Press, 1997), 354.

American space program, writing "The technocratic model triumphed under Presidents Kennedy and Johnson. Four months after taking office, Kennedy asked Congress to commit the United States to go to the moon.... Space technology was drafted into the cause of national prestige. Later, advanced technology in general was tapped as the vehicle for national and international regeneration."²

One could argue that America is following the example of the Royal Navy, in that she is rapidly moving ahead despite the lack of direct competition or nation-state threat. Two examples, one in the area of navigation and the other in surveillance, best address the potential for American technological domination of space.

The Europeans are talking now about fielding their first satellite navigation system (Galileo), while over the past fifteen years the U.S. moved through almost four generations of Global Positioning Systems (GPS) satellites, each a dramatic improvement over the previous. In the area of launch detection, the U.S. is in the process of not just upgrading, but completely replacing its Defense Satellite Program (DSP), the system used during Operation DESERT STORM to identify Iraqi SCUD missile launches, with a new generation of satellites known as the Space-Based Infrared System (SBIRS).³ These changes are occurring at the same time Russian navigation and surveillance capabilities are rapidly degrading and Chinese capabilities are rudimentary at best.

Continuation of the technological domination model would require the U.S. to assure research and development are adequately funded, enhance educational opportunities in engineering and science, and protect the American industrial base for space operations (i.e., protectionism). Moves in this direction are visible, as the American government over the past fifteen years has allowed companies to position themselves for greater technological domination and survivability by allowing merger after merger among aerospace corporations. Only a few years ago, Boeing, MacDonald-Douglas, Lockheed, Martin, Marietta, Northrop, Grumman, and TRW existed as separate companies; today, there are three companies—Boeing, Lockheed-Martin, and Northrop-Grumman—where once there were eight.

Multilateral Action

Over the past 100 years, the United States has exhibited a long history of operating in concert with other nations on the international scene. From Woodrow Wilson and the League of Nations through President George H. W. Bush and Operation DESERT STORM, the U.S. has not only actively engaged in traditional multilateral relations, but also led attempts to build coalitions of like-minded nation states where threats exist. Following World War II, the U.S. has actively cooperated in building an international system that has greatly benefited its national interests. How might this model be played out in the future? Past and present examples abound.

²Walter A. McDougal, *...the Heavens and the Earth*, (New York: Basic Books, Inc., 1985), 8.

³Jim Banke and Roger Guilemette, "Missile Warning Satellite Ready to Fly Friday from Cape Canaveral," SPACE.com, n.p.; on-line, Internet, 26 July 2001, available from http://www.space.com/missionlaunches/launches/titan4_dsp_preview_010726.html.

As American interests have become relevant on the international scene, the U.S. has chosen time and again to become a major multilateral player. Before the collapse of the Soviet Union, the two Cold War enemies shared technologies making possible a joint U.S.-Soviet Apollo-Soyuz docking in 1975. Following the Soviet Union's demise, the U.S. jointly manned the Russian Mir space station. In 1994, the U.S. engaged with South Korea and Japan to forestall North Korean nuclear weapons development. In Bosnia and Kosovo, the U.S. operated under NATO's umbrella, and in Afghanistan the U.S. worked outside of NATO, with Britain, Turkey, Germany and other nations to rebuild the country following the fall of the Taliban regime.

International forces exist that encourage U.S. policymakers to select multilateral engagement. The global nature of the world's economy places economic pressures on the U.S. to take into account the international flow of capital, which has grown to approximately \$2 trillion each day.⁴ Organizations like the World Trade Organization (WTO), the General Agreement on Tariffs and Trade (GATT), and the North America Free Trade Agreement (NAFTA) build bonds of common interest, embedding national commercial interests deeply into the fabric of international relations. The global economy makes it much more difficult to exclude other nations when determining any U.S. course of action.

When U.S. policymakers have chosen to follow the multilateral model, they have found it to be quite useful. It gave international legitimacy to military operations during the Korean War and DESERT STORM, as well as providing much needed funding during the later. Cooperation under the auspices of the International Space Station provides a medium not only for technological cross flow, but also sharing financial and operational risk, certainly an attractive option when developing future U.S. space policy.

Unilateral Action

America also has a long history of unilateral action. Where American interests are at stake, the U.S. has shown a willingness to go it alone, dating back to the negotiations for independence from Britain, the attack on the Barbary pirates in 1805, the capture of the American Southwest from Mexico and the Philippines from Spain, through and beyond the Cold War with action in Granada, Panama and Haiti. Out of the American Western experience and its own Civil War came an approach to how it viewed the world. Stories of the exploits of Daniel Boone, Davy Crockett, and Abraham Lincoln came the deeply held belief that individual action could make a difference. Protected by two oceans, American foreign policy was essentially isolationist in nature through most of its history. Despite involvement in World War I, American foreign policy reverted to its pre-war stance shortly following the end of hostilities, exhibited by the failure to join the League of Nations.

Following World War II, the United States seemed ready to step forward and embrace its newfound role on the international scene as it led the world in founding the United Nations. Presidents Franklin Roosevelt and Harry Truman projected an understanding that American

⁴T.J. Pemel, "Beyond Bilateralism: Japanese and U.S. Cooperation Conflict in multilateral Asia," Research Institute of Economy, Trade & Industry, BBL Seminar, n.p.; on-line, Internet, 6 December 2001, available from <http://www.rieti.go.jp/jp/events/bbl/01120601.html>.

interests were best served by fashioning an international system that would promote the rule of law, conflict resolution, and standards of social justice. The emergence of the Cold War, however, immediately hindered the U.S. movement toward a vision of internationalism, leading to a world centered around two armed camps.

With the end of the Cold War, many Americans again doubted the benefit of international engagement, as it refused to pay its arrears to the United Nations, refused to ratify key international conventions, came forward with a series of unilateral sanctions against countries with which it disagreed (e.g., Cuba and the Helms-Burton Act), and politicians like isolationist Ross Perot and Patrick Buchanan gained national followings. Moving contrary to international opinion on the Kyoto Protocol, the Comprehensive Test Ban Treaty, the International Criminal Court, and the Biological Weapons Convention, many could conclude that unilateralism will be the American foreign policy signature of the twenty-first century.⁵

Many Americans have long mistrusted the United Nations and other such organizations for their lethargy and inability to make a difference, pointing to actions like those in Bosnia and Kosovo where it has been American troops that ensured peace. In the 2000 presidential elections, George W. Bush ran on a platform denouncing nation building, something some Americans described as a wasted effort in a world that does not appreciate what they did during World Wars I and II, much less today.

Unilateral action can provide results favorable to U.S. national interests; the capture of Manuel Noriega during the invasion of Panama under President Bush and regime change in Haiti under President Clinton are but two examples. Policymakers have also seen that when America acts unilaterally, critics often follow. While few European nations supported the U.S. decision to move forward with a missile defense system, many European aerospace companies seeking ways to grow in tough economic times, are now pressing their governments to show interest in an initial missile defense system. Some firms have also secured their governments' approval to begin exploratory talks with Boeing Corporation on a possible European role in the U.S. missile defense effort. Philippe Couillard, president of European Aeronautic, Defence and Space Company Launch Vehicles, Les Mureaux, which makes ballistic missiles and Ariane rocket segments, acknowledged that missile defense is one of several space-based defense efforts that European governments cannot ignore indefinitely.⁶

In the arena of space operations, the U.S. has also exhibited a propensity to act unilaterally. In the post-World War II environment, it was easy for policymakers to justify the "us versus them" approach. American pride and national interests were at stake as President John F. Kennedy proclaimed in 1961 that the U.S. would have a man on the moon before the end of the decade, never mind a U.S. astronaut had not yet orbited the earth. It was no mistake that the U.S. space program was a unilateral effort and that only Americans have ever walked on the moon.

⁵Steven E. Miller, "The End of Unilateralism or Unilateralism Redux?," *The Washington Quarterly*, The Center for Strategic and International Studies and the Massachusetts Institute of Technology, (Winter 2002), 27.

⁶Peter B. de Selding, "European Space Companies Push for Missile Defense Role," *DefenseNews*, Army Times Publishing Company, Springfield, VA, ISSN 0884-130X, (November 11-17, 2002), 56.

Will America choose to go it alone in space operations as it did during the Cold War? The signals are mixed with Boeing and Lockheed-Martin having developed their next generation commercial boosters principally without foreign involvement; a trend also exhibited among other space-faring nations, while increasing international cooperation exists with the International Space Station. Policymakers must determine if unilateral action, which preserves American sovereignty and which makes possible rapid independent response to any given threat, is the most appropriate model in a global society with an increasing number of international organizations and interdependency.

American Empire

Many theorists have postulated on the paradigm that would replace the Cold War's bipolar global engagement. Thomas Donnelly, deputy executive director of the Project for the New American Century, a Washington, D.C. think tank, argues that the U.S. is an empire, not one bent on global conquest by establishing colonies, but an empire of democracy or liberty spreading its influence globally through its military, economic and cultural presence. A former journalist and congressional aide, Donnelly argues that the sooner the U.S. government recognizes that it is managing an empire, the faster it can take steps to reshape its military and its foreign policy to fit the mission.⁷

Andrew Bacevich, a retired Army colonel and now a professor of international relations at Boston University, also concludes that America is an empire. He argues that, "In all of American public life there is hardly a single prominent figure who finds fault with the notion of the United States remaining the world's sole military superpower until the end of time... The practical question is not whether or not we will be a global hegemon, but what sort of hegemon we'll be."⁸

Donnelly and Bacevich argue that until American policymakers candidly acknowledge they are playing an imperial role on the world stage, U.S. strategy will be muddled, the American people will frequently be surprised by the resentment the U.S. meets overseas, and the military will not be given the resources necessary to carry out its missions, such as more troops trained for a "constabulary" role of peacekeeping and suppressing minor attacks, along the lines of the nineteenth century British military.⁹

The view of America as an empire emphasizes the U.S. tendency to use military force to resolve international affairs. One can point to an almost unbroken chain of military actions that include Thomas Jefferson and the Barbary pirates, James K. Polk in the Mexican-American war, and virtually all the twentieth century presidents, from Woodrow Wilson in the U.S.-Mexican border crisis, to George W. Bush in Afghanistan. Thomas Donnelly emphasizes, "I think

⁷Thomas E. Ricks, "Empire or Not? A Quiet Debate Over U.S. Role," *The Washington Post*, August 21, 2001, section A, 01.

⁸Andrew J. Bacevich, *American Empire: The Realities and Consequences of U.S. Diplomacy*, (Cambridge, MA: Harvard University Press, 2002), 244.

⁹Thomas E. Ricks, "Empire or Not? A Quiet Debate Over U.S. Role," *The Washington Post*, August 21, 2001, section A, 01.

Americans have become used to running the world and would be very reluctant to give it up, if they realized there were a serious challenge to it.”¹⁰

If Donnelly and Bacevich are correct about America being an empire, one could postulate that future U.S. space policy may emphasize military dominance and there are indications that policymakers are headed in this direction. The U.S. military refers to space as the next medium, in the same construct as land, sea or air. United States Space Command’s *Vision for 2020* proclaims, “Historically, military forces have evolved to protect national interests and investments—both military and economic... Likewise, space forces will emerge to protect military and commercial national interests and investment in the space medium due to their increasing importance.”¹¹ Is the realization of weapons in space far behind?

The Best Example

Which model would serve as the best example for policymakers? Convincing arguments can be made for each. The answer must be found in which model most accurately represents the current world environment and which best addresses U.S. national security concerns. The final chapter of this paper will address both these issues.

¹⁰Ibid

¹¹United States Space Command, *Vision for 2020*, Colorado Springs, CO, February 1997, 3.

Chapter 7

The Multilateral Approach

Reflecting a global awareness, future U.S. space policy should and will be predicated on multilateralism. U.S. policy will certainly use elements from the other models that have been described, to include technological dominance, unilateral intervention, and military might, but will rely most heavily upon working within the international framework to protect vital U.S. space interests. International engagement and discourse rather than confrontation and military action will become the leading feature of future U.S. national space policy. This thesis, though, supposes two questions: 1) Why should the U.S. use a multilateral approach; and 2) Even if the U.S. should follow a multilateral approach, what evidence exists to indicate that it will?

Why U.S. Policymakers Should Follow a Multilateral Approach

Given how highly interdependent the world has become, the U.S. really has no feasible alternative to multilateralism. Furthermore, this approach is the best strategy for policymakers as it has the highest probability for long-term success. Wayne S. Smith, senior fellow at the Center for International Policy in Washington, D.C., concludes, "In an age of instant communications, multinational and global flows of capital, the idea that even the powerful United States can decide for itself is illusory."¹

It is in the national self-interest for the U.S. to build international bridges in the arena of space operations. The factors that will drive multinational cooperation—cost, limited direct influence over international players through military or economic action, international treaties and organizations, the proliferation of multinational companies and an overall desire by the U.S. to be perceived as a team player—rely on international cooperation and global interdependence. Before delving deeper into why America should follow multilateralism, it is best to look closely at the reasons it will not follow the other three models.

The technological example set forward by the British Royal Navy during the latter half of the nineteenth century presents an interesting example for U.S. policymakers, but scientific knowledge is difficult to contain. At the close of World War II, the U.S. was the only nuclear-capable nation. Despite the tight security placed upon America's nuclear secrets, fifty-five years later nations from Iraq to North Korea, India and Pakistan have the ability to develop and deploy nuclear weapons. In 1960, only two nations were members of the elite space-faring club; today, that number has risen to at least seven, plus the ESA, and could well double within the next generation, as technology proliferates across the globe.

¹Wayne S. Smith, "The Trend Toward Unilateralism in U.S. Foreign Policy," Center For International Policy, Washington, D.C., n.p.; on-line, Internet, November 1999, available from <http://www.us.net/cip/unilateralism.htm>.

Furthermore, if technological development is an issue, any group willing to expend the funds can purchase a satellite on orbit from numerous commercial or governmental agencies. If funding is an issue, any number of services can be shared or directly purchased in such areas as communication or surveillance. As we have seen, commercial companies, such as SPOT, provide high-resolution imagery for public consumption at a nominal cost. Technological edges cannot be safeguarded or guaranteed in perpetuity, particularly in a global environment. Once the bottle is opened, it is impossible to get the genie back inside.

A second alternative policy, unilateralism, does preserve freedom of action in the short term; the question, however, is whether U.S. policy should be based upon short-term gain over long-term benefits; whether independence trumps cooperative action which fosters adherence to the rule of law and strengthens international organizations. Unilateral action often reinforces the view of an American "cowboy" approach to foreign policy, generating resentment that makes it more difficult for the U.S. to deal cooperatively with the international community on other issues of common interest (e.g., U.S./European relations concerning Iraqi disarmament). This growing anti-American sentiment is represented by mass demonstrations in Europe and the Middle East in February 2003 against potential American military action against Iraq, and numerous public demonstrations in South Korea protesting the decades-old American military presence.

While a multilateral approach takes more time to implement, it provides benefits across the international spectrum, including trade, investment, intelligence sharing, and space operations. It does this by building an atmosphere of trust and a greater willingness to engage in dialogue and to cooperate on matters of mutual national interest. Stephen Miller, director of the International Security Program at Harvard's Kennedy School of Government, states that U.S. policy must change dramatically to accommodate the exigencies of the war against terrorism. He subscribes to the belief that the world did in fact change following the attack on 11 September 2001; above all else, he claims that September 11 and its aftermath must spell the end of U.S. unilateralism.² He notes that while strong intelligence ties exist with allies and close friends, the U.S. may wish to point those collaborative efforts more directly at the growing terrorist threat and to use existing networks in different ways.³ Miller proposes that the best hope U.S. policymakers have to influence the international community is to draw the major states into networks of cooperation and consultation. Compromise need not be seen as a sign of weakness, but rather as a means of moving toward an objective with the cooperation of others, thus at a lower cost to the United States.

The third alternative policy, the American Empire theory, emphasizes the global nature of American influence and its tendency to use military might to obtain national interests. Joseph Nye, dean of the Kennedy School of Government, addressed this issue by saying, "I think people who talk about 'benign hegemony' and 'accepting an imperial role' are focusing too much on one dimension of power and are neglecting the other forms of power—economic and cultural

²Steven E. Miller, "The End of Unilateralism or Unilateralism Redux?," *The Washington Quarterly*, The Center for Strategic and International Studies and the Massachusetts Institute of Technology, (Winter 2002), 15.

³*Ibid.*, 16.

ideological.”⁴ Along the same lines, Richard Kohn, a University of North Carolina historian, argues that most Americans would wisely reject an imperial role if it were put to them openly. “The American people don’t have the interest, the stomach or the perseverance to do it.”⁵ Stephen Miller adds, “The unrivaled military superpower cannot, by arms alone, protect itself from the violence and fanaticism of the weak and the dispossessed.”⁶ Current military force levels make it problematic for U.S. global control; furthermore, short of invasion and occupation, how could America use its military might to control international space efforts?

Leading with the military as a policy approach has significant technological limitations as well. Despite being the sole remaining superpower, any long-term action without multilateral support is extremely difficult. The U.S. Army requires land-basing rights, as it had with Saudi Arabia during Operation DESERT STORM; the Air Force, while possessing significant air refueling capability, desires land bases within the theater of operation for rapid mission turnaround and the ability to produce multiple sorties; and while the Navy with its carrier task forces is the most self-sufficient service, when engaged in offensive operations, naval aircraft fall prey to the same restrictions found with Air Force fighter aircraft (i.e., short range and limited payload).

Consequently, U.S. policymakers have few other real alternatives to multilateralism. America cannot expect to protect its technological edge in perpetuity, unilateral action does not garner international legitimacy or foster long-term international cooperation, and, despite being the sole remaining superpower, the U.S. military has severe restrictions that demand multinational collaboration. Thus, American policymakers need to design a strategy to protect vital U.S. space interests based upon a multilateral approach. The next question is, Will they?

Why Policymakers Will Follow a Multilateral Approach

Pivotal to understanding why U.S. policymakers will chose multilateralism is the realization that U.S. space policy exists as a subset of a larger national strategy. Throughout its existence, U.S. national strategy and foreign policy have been pragmatic and results oriented. Time and again, America in the twentieth century demonstrated that acting cooperatively in the international arena was the most effective means of legitimizing any foreign policy move. In his opening remarks to the September 2002 National Security Strategy, President Bush declared, “In keeping with our heritage and principles, we do not use our strength to press for unilateral advantage. We seek instead to create a balance of power that favors human freedom: conditions in which all nations and all societies can choose for themselves the rewards and challenges of political and economic liberty.”⁷

⁴Thomas E. Ricks, “Empire or Not? A Quiet Debate Over U.S. Role,” *The Washington Post*, 21 August 2001, section A, 01.

⁵Ibid.

⁶Steven E. Miller, “The End of Unilateralism or Unilateralism Redux?,” *The Washington Quarterly*, The Center for Strategic and International Studies and the Massachusetts Institute of Technology, (Winter 2002), 26.

⁷U.S. National Security Council, *The National Security Strategy of the United States of America* (National Security Council, September 2002), n.p.

Within the body of the 2002 National Security Strategy, policymakers clearly articulated the U.S. concept of global engagement, "America will implement its strategies by organizing coalitions—as broad as practicable—of states able and willing to promote a balance of power that favors freedom." Those who fear an American empire or unilateral action on its part need only read further: "There is little of lasting consequence that the United States can accomplish in the world without the sustained cooperation of its allies and friends in Canada and Europe."⁸

Despite some actions by the Bush administration, Steven Miller sees other indicators that suggest U.S. policy in the twenty-first century will be multilateral in nature as well. Though George W. Bush campaigned on a unilateral approach to foreign policy, Miller believes that Washington's priorities have changed. He emphasizes that the war against terrorism will take precedence over all else and affirms that the United States will undoubtedly continue the diplomatic maneuverings it thinks are necessary or desirable to permit and support its war against terrorism.⁹

A strong indicator of American multilateral intent is the U.S. engagement within the United Nations concerning Iraqi weapons inspections. By the summer of 2002 it appeared to many that the U.S. was willing to act alone against Iraq to enforce UN disarmament resolutions.¹⁰ However by the end of the year, even former President Jimmy Carter stated, "The government has decided that action should be multilateral. The U.S. has taken a completely appropriate multilateral position."¹¹ Working with the international arena, U.S. policymakers engaged within the UN and received in November 2002 a unanimous vote by the Security Council supporting an American drafted resolution.¹² Despite the situation as it evolved following that vote, the U.S. stayed engaged within the Security Council for yet another four months before taking action with a "coalition of the willing." According to Secretary of State Colin Powell, this coalition constituted the third largest multilateral military force over the past 100 years.¹³

How does the propensity for international cooperation in U.S. foreign affairs translate to space operations? Eric Javits of the U.S. State Department wrote in 2002, "The United States is committed, through its national space policy, to ensuring that exploration and use of outer space remain open to all nations for peaceful purposes and for the benefit of all humanity."¹⁴ Speaking of the American space effort, Dr Ron Sega, director of defense research and engineering, stated,

⁸Ibid., 25

⁹Steven E. Miller, "The End of Unilateralism or Unilateralism Redux?," *The Washington Quarterly*, The Center for Strategic and International Studies and the Massachusetts Institute of Technology, (Winter 2002), 25.

¹⁰Johathan Marcus, "U.S. Looks for crucial war allies," BBC News World Edition, n.p.; on-line, Internet, 4 December 2002, 1715 GMT, available from <http://news.bbc.co.uk/2/hi/europe/2543547.stm>.

¹¹British Broadcasting Channel, "Carter warns against 'catastrophic' war," BBC News World Edition, n.p.; on-line, Internet, 10 December 2002, 1358 GMT, available from <http://news.bc.co.uk/2/hi/americas/2561767.stm>.

¹²"U.N. passes Iraq resolution on weapons inspections," CNN.com, Internet, 8 November 2002, n.p.; on-line, available from <http://www.cnn.com/2002/US/11/08/iraq.resolution/index.html>.

¹³"Powell: 30 Countries to Help in Iraq War," WSOCTV.com, Internet, 18 March 2002, n.p.; on-line, available from <http://www.wsocvtv.com/print/2047552/detail.html>.

¹⁴Eric M. Javits, "A U.S. Perspective on Space," *Future Security in Space: Commercial, Military, and Arms Control Trade-Offs*, James Clay Moltz, ed., Center for Nonproliferation Studies, Mountbatten Centre for International Studies, University of Southampton, (July 2002), 52.

"I think it's natural to develop common technologies together. At the end of the day, we may have different requirements and different systems, but there's a lot of...common work that we can do in research and development."¹⁵ Dr Segal's outlook can apply to the international arena, as well. Following this line of logic, The Commission to Assess United States National Security Space Management and Organization, chaired by Donald Rumsfeld, recommended that "the United States must participate actively in shaping the [international] legal and regulatory environment" for space activities.¹⁶

In an area of commercial, if not political rivalry, the U.S. has chosen to engage in discourse with a potential competitor. American and European policymakers are actively involved in cooperative discussions concerning the ESA's navigation satellite program, Galileo. Edelgard Bulmahn, Germany's Federal Minister of Education and Research concluded, "The existing American Global Positioning System and Galileo should not be seen as separate or opposed systems but they [GPS and Galileo] are to supplement each other so that both sides can reap the greatest benefit possible."¹⁷ In a 1 December 2001 letter to NATO member governments, Deputy Secretary of Defense Paul Wolfowitz warned EU members about overlapping spectrum between GPS and Galileo, but added that "acceptable solutions can be found that we can avert potential serious impacts."¹⁸ John Logsdon of George Washington University's Space Policy Institute, proposed that change is necessary to ensure that GPS and Galileo do not interfere with one another, and so they can be developed and operated in a complementary manner.¹⁹ Rick Skinner of Lockheed Martin Corporation, stated, "there are clearly opportunities for collaboration between Galileo and GPS for our mutual protection of the radio frequency spectrum so that we can get the most performance out of our respective systems. We should work together to have a unified stance within the International Telecommunications Union as well as solicit support from all global navigation satellite system users to assist us in the protection of this vital resource."²⁰

Facing daunting economic and technological challenges, U.S. policymakers decided early on that a multilateral approach was in the national self-interest as they entered the next stage in space exploitation, building the International Space Station. Despite an estimated cost exceeding \$100 billion when completed, with most of the funding coming from the U.S., American policymakers actively engaged a 16-nation coalition in developing the ISS.²¹ This cooperative effort became a win-win scenario, particularly in light of the shuttle *Columbia* accident where

¹⁵Scott Elliott, TSgt, USAF, "Partnership will guide military, civilian space activities," *Air Force Link News*, n.p.; on-line, Internet, 17 October 2002, available from <http://www.af.mil/news/Oct2002/101702364.shtml>

¹⁶John M. Logsdon, "Just Say Wait to Space Power," *ISSUES In Science and Technology online*, n.p.; on-line, Internet, (Spring 2001), available from http://www.nap.edu/issues/17.3/p_logsdon.htm

¹⁷Edelgard Bulmahn, "Europe's Ambitions in Space," presentation made at the Center for International Science and technology Policy of the George Washington University, Washington, D.C., 6 Feb 02.

¹⁸*SpaceDaily*, "U.S. Warns EU About Galileo's Possible Military Conflicts," n.p., on-line, Internet, 18 December 2001, available from <http://www.spacedaily.com/news/gps-euro-01g.html>

¹⁹John M. Logsdon, "A Security Space Capability for Europe? Implications for U.S. Policy," *Security Space Forum*, Space Policy Institute, George Washington University, Summer 2002.

²⁰Rick Skinner, "Galileo and GPS-Competitors or Complements," The French Center on the United States (CFE), Paris, France, 5 April 2002, speech given at a CFE meeting in Paris.

²¹Richard Stenger, "Mir destroyed in fiery descent," CNN.com, n.p.; on-line, Internet, March 23, 2001, 1201 GMT, available from <http://www.cnn.com/2001/TECH/space/03/23/mir.descent/>

Russian resupply vehicles became the only lifeline for the three person crew; and as the Russians most certainly took into account their involvement in the ISS project as a factor in allowing their once crown jewel, the MIR space station, to deorbit in March 2001.²²

Previous multilateral actions taken in space operations have proven quite beneficial to U.S. national interests; specifically in the areas of launch, exploration, and development (e.g., the ISS). The sharing of risk and cost, coupled with technological cross flow, continues to pay dividends. The willingness to cross talk on programs like navigation systems, provides great hope for further engagements.

Taking a multilateral approach, however, does not restrict American action. When no other options exist, the U.S. will use technological protectionism, unilateralism, and the might of its impressive military to protect its national interests. Paramount to appreciating the American approach is a statement President Bush's opening remarks to the 2002 NSS, "Defending our Nation against its enemies is the first and fundamental commitment of the Federal Government." It continues, "...we must make use of every tool in our arsenal..."²³ That arsenal has and always will include multilateralism.

This paper has examined policy options that produce the best U.S. response to the increased international development of space. The long history of American involvement on the international scene suggests continuity in U.S. foreign policy from administration to administration. There is little evidence to suggest U.S. space policymakers will take a different approach. The president's introductory letter to the 2002 NSS puts the American approach in context by concluding, "The United States is committed to lasting institutions like the United Nations, the World Trade Organization, the Organization of American States, and NATO as well as other long-standing alliances... In all cases, international obligations are to be taken seriously."²⁴

²²Ibid.

²³U.S. National Security Council, *The National Security Strategy of the United States of America* (National Security Council, September 2002), President George W. Bush's opening letter.

²⁴Ibid.

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